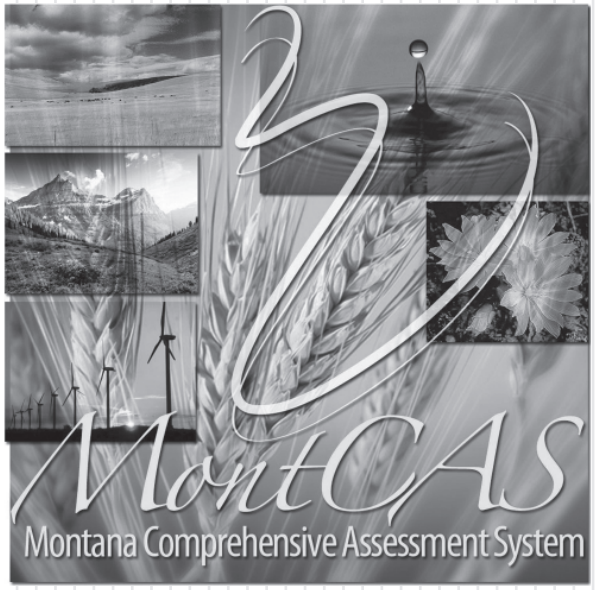
Montana Comprehensive Assessment System (MontCAS CRT)

Grade 8
Common Released Items
Spring 2010



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Montana
Office of Public Instruction
Denise Juneau, State Superintendent

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Reading Directions for Spring CRT

This Reading test contains three test sessions. Mark or write your answers in the Answer Booklet. Use a pencil to mark or write your answers.

This test includes two types of questions: multiple-choice and constructed-response questions.

For the multiple-choice questions, you will be given four answer choices—A, B, C, and D. You are to choose the correct answer from the four choices. Each question has only one answer. After you have chosen the correct answer to a question, find the question number in your Answer Booklet and completely fill in the circle for the answer you chose. Be sure the question number in the Answer Booklet matches the question number in the Test Booklet. The example below shows how to completely fill in the circle.

CORRECT MARK	INCORRECT MARKS
●	❍ ⊙ ◉ ⊘

If you decide to change your answer to a question, erase the wrong mark completely before filling in the circle of the new answer. Be sure you have only one answer marked for each question. **If two circles are bubbled in for the same question, that question will be scored as incorrect.**

If you are having difficulty answering a question, skip the question and come back to it later. Make sure you skip the circle for the question in your Answer Booklet.

For the other types of questions in the Test Booklet, you will be asked to write your answers in the box provided. Read the question carefully. If a question asks you to explain your answer or to show your work, be sure to do so.

You may make notes or use highlighters in your Test Booklet, but you must bubble or write your final answers in your Answer Booklet. **Do not make any stray or unnecessary marks in your Answer Booklet.**

Let's work through a sample question together to be sure you understand the directions.

Sample Question

1. What is the capital of Montana?
   A. Browning
   B. Glendive
   C. Helena
   D. Missoula

Reading

Read this article about what causes the thunder we hear. Then answer the questions that follow.

Inside a Thundercloud

Franklyn M. Branley

Thunderclouds, or thunderheads, tower upward on a hot summer day, sometimes as much as 8 or 10 miles. Winds high up spread the top into a flat, anvil shape.

Updrafts move air away from the hot earth, and cold air from the top of the cloud falls rapidly toward the earth. Airplanes stay away from thunderheads because these up and down drafts could tear the airplane apart.

Inside the cloud there may be snow, ice, rain, or hail. Lightning flashes from top to bottom and from side to side.

What Causes Thunder?

It is certain that thunder is related to lightning. But the relationship is not clear. Several theories have been suggested to explain why there is thunder.

1. A lightning stroke creates a vacuum. The sound is produced when air rushes in to fill the vacuum.

2. Water drops in the atmosphere are turned into steam. As the steam expands, it produces the rumble of thunder.

3. Lightning breaks water molecules into hydrogen and oxygen. The two gases recombine explosively and produce the clap of thunder.

4. Lightning causes intense heating of the air along its path, just as electricity causes heating of a wire. Rapid expansion of the hot air causes thunder.

Each of these facts probably contributes to thunder. But the main influence is the last—heating followed by rapid expansion of the air.

Temperatures along the path of a lightning discharge may reach 30,000° Celsius, and the pressure may become 10 to 100 times greater than the normal pressure of the atmosphere. The air expands very rapidly, and part of the energy the gases contain is converted to the loudest of all natural sounds.

If you listen carefully you'll notice there may be loud cracks, rumbles, or booms depending on the nature of the lightning in the storm.

A lightning flash usually begins at the bottom of a cloud about five kilometers above the earth where the temperature is –10° Celsius. This is the region where water droplets freeze. Electric charges build up there, sometimes reaching 300 million volts.

The flash begins when electrons released from the droplets collide with air, freeing more electrons. The charge of electrons may extend 50 to 100 meters. Another step begins, carrying the charge still further. Most usually this extension is still within the cloud, but also more toward the earth.

Sparks may be given off by tall objects on earth such as steeples or tall trees. When a spark reaches the step of lightning, a path to the ground is made. A discharge between earth and the cloud begins—the return stroke of lightning. The movement from the cloud to the ground may take a few thousandths of a second, but the return stroke is completed in just a few millionths. Movement to earth and back to the cloud may continue many times in a single flash, making the lightning stroke pulsate.

The steps of the flash may be only a few meters long, or as much as 100 meters. You can see the steps in the jagged shape of the flash. Each step produces thunder. Loud, ear-splitting cracks occur when the sound waves of many steps reach you together. Rolling, sustained sound occurs when the sound of various steps not in a direct line to you reaches you at delayed intervals.

The lightning channel may be five kilometers long, and often it is much longer. Thunder lasts because sound from the nearest part of the channel reaches you before sound from the farthest part.

1. According to the article, scientists are unsure
   A. why lightning travels quickly.
   B. what causes thunder to occur.
   C. how lightning is usually formed.
   D. when thunder is likely to begin.

2. In the third theory listed under **What Causes Thunder?** the words “recombine explosively” are used to show
   A. what happens when the hydrogen and oxygen come together.
   B. when the hydrogen and oxygen first begin to break apart.
   C. how hydrogen and oxygen are created within lightning.
   D. what causes hydrogen and oxygen to form during a storm.

3. What is the **most likely** reason the author uses a numbered list in the section **What Causes Thunder**?

   A. to show that the theories are equally important
   B. to explain which theories were thought of first
   C. to indicate which theories have been proven
   D. to organize the theories for easier reading

4. The "steps" of lightning flashes are seen as

   A. bright colors.
   B. dark clouds.
   C. jagged shapes.
   D. tall objects.

5. The author of this article would **most likely** agree that

   A. there is no way to determine how far away lightning is.
   B. it is very unusual for lightning strikes to reach the ground.
   C. it is not clear why the sound of thunder travels slowly.
   D. there is still much to learn about why thunder occurs.

6. The **main** purpose of this article is to

   A. provide the reader with resources for studying thunder.
   B. instruct the reader about how to stay safe in a storm.
   C. inform the reader about how and why thunder occurs.
   D. teach the reader how to conduct a weather experiment.

7. Which part of a science book would **most likely** contain the meaning of the word Celsius?

   A. acknowledgments
   B. bibliography
   C. glossary of terms
   D. table of contents

In this passage from a book about his childhood, author Laurence Yep remembers his grandmother. Read the passage and then answer the questions that follow.

My Brooklyn Grandmother
from *The Lost Garden*

Laurence Yep

Eating with my grandmother took a certain amount of concentration.

My grandmother had become a great cook; and, like any good cook, my
2 grandmother was careful about her praise. The highest compliment she gave to another cook was to allow how Auntie Mary's cooking wasn't bad.

Like all good cooks, my grandmother was especially particular about the ingredients. For one thing, she preferred small sweet potatoes, eating those with gusto. She was fussiest, though, about rice.

One day she asked me to help her in the kitchen—which was her way of saying that she was going to teach me. First, she announced, we were going to
4 wash the rice. In the old days, washing rice was wise because I'm told they used talcum on the grains. Even now, it's wise to wash the rice at least once to see what might come up.

My grandmother had me pour lukewarm water into a pot of rice and swirl my hand around in it. Instantly the water turned milky; and she had me look alertly for stray bits of chaff or even the occasional pebble that might slip by the processing machines.

Then, setting the lid over most of the pot, I had to pour the water out gently. However, when I asked her what the next step was, she told me that the rice wasn't clean yet and to refill the pot with lukewarm water and repeat the process. By the sixth time, the water was clean no matter how often I swirled my hand around. Even then, that wasn't enough. I remember my fingers were wrinkled by the time she declared the dirt was gone—as were most of the vitamins and nutritional elements as well.

My grandmother, like most experienced cooks, never used exact measurements. It was a pinch of this or a handful of that. When she had me add water the final time, she rested her fingertip on the surface of the rice until the water came up almost to the knuckle of her index finger. Then the rice was allowed to soak for a half-hour before cooking. The rice was brought to a boil, stirred once with a spoon, and then allowed to simmer for twenty minutes. The result was rice of just the right consistency and density.

Along with the cooking lessons, some of my grandmother's own personality soaked into me. I've never been able to <u>abide</u> instant rice—which tastes mushy to me. Brown rice tastes musty; and I've never been able to get the hang of a modern rice cooker. Instead, I still make rice basically the way grandmother showed me, even to measuring the water in the pot with a knuckle—though I only wash the rice once now. I think some of the fussiness over the rice carries over into my writing, forcing me to write several drafts of a book before I'm satisfied.

8. In paragraph 2, the author implies that his grandmother

   A. did not believe most people knew how to cook.
   B. did not enjoy teaching others how to cook.
   C. was interested in learning all she could about cooking.
   D. was used to cooking for a large number of people.

9. In paragraph 4, the author says "which was her way of saying that she was going to teach me" to show **mainly** that he

   A. is interested in learning how to wash and cook rice.
   B. is impatient with the way his grandmother does things.
   C. believes he already knows how to wash and cook rice.
   D. understands the true meaning of his grandmother's words.

10. What does the author **most likely** mean in the last paragraph when he says, "some of my grandmother's own personality soaked into me"?

    A. He looks a lot like his grandmother did at his age.
    B. He is as good a cook as his grandmother was.
    C. He is fussy about many things like his grandmother was.
    D. He is a great cook and is careful with his praise.

Use the dictionary entry below to answer question 11.

abide *v* **1.** to remain, continue, stay: *Abide with me.* **2.** to put up with, tolerate, stand: *I can't abide dishonesty.* **3.** to wait for, await: *to abide the coming of the spring season* **4.** to accept without opposition or question: *to abide the verdict of the judges*

11. Which definition of the word <u>abide</u> is used in the last paragraph?

    A. definition 1
    B. definition 2
    C. definition 3
    D. definition 4

12. According to the last paragraph, which lesson about writing did the author learn from his grandmother?

    A. Being thorough leads to quality.
    B. Be selective about giving praise.
    C. Experience is the best teacher.
    D. It is important to follow directions.

13. Which word **best** describes the author's feelings about what his grandmother taught him?

    A. excited
    B. grateful
    C. indifferent
    D. resentful

14. This passage is an autobiography because it contains

    A. a writer's comments about his work.
    B. a person's recollections of his childhood.
    C. instructions for properly cleaning and cooking rice.
    D. a scene showing the relationship between two characters.

Read this article about Thurgood Marshall, who served on the United States Supreme Court. Then answer the questions that follow.

Thurgood Marshall: A Man of Determination

Juan Williams

In the first grade, at age six, he did not like his first name: THOROUGHGOOD. It was too long. Even his parents didn't call him that. When his mom and dad called out to him, they just shouted, "Goody."

His friends teased him about his name. They called him "Goody-Goody," or they made a game of stretching out every part of his name—"Hey, Tho-rooooo-gooood," they would say with a laugh.

So, Thoroughgood Marshall decided to change his name. He told everyone to call him "Thurgood." His mother, Norma Marshall, was so impressed that she agreed to put his new, shorter name on his birth certificate.

Changing your name requires the courage to tell people what you want them to call you and the determination to stick with it. That simple act of strength by young Thurgood was the first sign of his extraordinary ability to create change for the better. He could see a problem, and he had the determination to solve it.

4

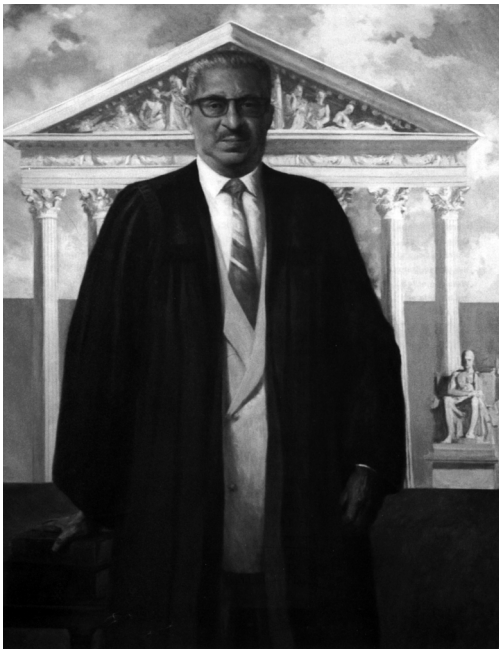
That spirited boy grew up to become a legend as a lawyer who changed America for the better. Marshall won several important courtroom arguments that changed the nation's laws, thereby ensuring that every American is treated equally. He won a famous Supreme Court case, the *Brown* decision, that guarantees that no one can be kept out of a public school because of his or her skin color.

5

Marshall also changed America's laws to allow Jewish people and racial minorities to buy houses and live in any neighborhood. He supported and argued for the rights of all people to travel together on buses and sit wherever they want to sit. He pushed for legislation that gave everyone, without regard to race, the right to vote.

6

This amazing record of creating change made Marshall into a hero for many people. His ability to win cases as a lawyer for the National Association for the Advancement of Colored People (NAACP) led President Lyndon Baines Johnson to name him the federal government's top lawyer, the solicitor general. President Johnson later named Marshall to the nation's highest court, the Supreme Court. He was the first African American to serve as solicitor general and the first to be named to the Supreme Court.



In his painting of Thurgood Marshall before the Supreme Court, American artist Nathaniel K. Gibbs clearly gives the viewer a sense that Marshall was a justice determined to make the U.S. legal system work.

His determination to be a great lawyer may have started when one of his teachers at Howard University's law school asked him to take a trip with him. The teacher wanted to look at the differences between the schools available to white children and black children. In some states at the time, the law required separation of schoolchildren by race.

To look at the differences between schools for black and white children in several states, the two men traveled in a car filled with pillows, blankets, and bags of food. They had to eat and sleep in the car because, in the early 20th century, black people were not allowed to stay in most hotels because of segregation.

One day, Marshall stood outside a school for black children while his law school professor went inside. He began eating a sandwich when an 8-year-old boy walked up to him. Marshall thought the boy was hungry and offered him a piece of his sandwich. But the boy pointed to an orange on the car seat. Marshall gave it to him, and he bit right through the skin. The bitter taste made his eyes grow big. He pulled the orange out of his mouth and started squeezing it, sending juice all over his face. Angered, Marshall told the boy to stop wasting the orange. Hearing the shouting, Marshall's professor came out of the school and told him that the boy did not know about peeling off the skin or slicing an orange. He said that this was the first time the 8-year-old had ever seen an orange.

Marshall was amazed that there were children growing up so poor and so lacking in education that they did not know what an orange was. He then went home to Baltimore to begin his career with renewed dedication to being a lawyer who made a difference. He especially wanted to change the laws so all children could get a good education.

When Marshall died in 1993, the U.S. flag draped his casket in the Great Hall of the Supreme Court in Washington, D.C. The court had to stay open all night so that thousands of people could walk up the white marble steps of the court and say goodbye to a determined man who had created so much change for the better. At his funeral, the chief justice of the Supreme Court, William Rehnquist, said, "Equal justice under law—surely no one individual has done more to make those words a reality than Thurgood Marshall."

15. Why does the article **most likely** begin with a story about how Thurgood Marshall changed his name?

    A. to explain where he spent his early years
    B. to show why he decided to become a lawyer
    C. to reveal an important character trait of his
    D. to describe how the neighborhood children treated him

16. In paragraph 4, the phrase "simple act of strength" is used to show

    A. how a small act can have a large meaning.
    B. why a small act can be misunderstood.
    C. why it is important to have strong leaders.
    D. how strong actions are needed to make change.

17. In paragraph 5, the author describes Marshall as spirited. A spirited person is someone who is

A. comical.
B. motivated.
C. organized.
D. thoughtful.

18. In paragraph 5, the author refers to Marshall as "a legend as a lawyer" because Marshall

A. wrote many stories about his life.
B. was known for having an unusual name.
C. was admired for his contributions to society.
D. became successful at a very young age.

19. According to the article, the *Brown* decision is important because it guarantees

A. a discussion of the nation's laws.
B. equality in public education.
C. the creation of the Supreme Court.
D. recognition of Marshall's achievements.

20. In paragraph 6, the phrase "without regard to race" means race was not

A. considered.
B. determined.
C. discussed.
D. introduced.

21. What is the **main** reason the example of the boy and the orange is included in the article?

A. to show what motivated Marshall to change the laws
B. to explain why the professor was important to Marshall
C. to describe how Marshall was named to the Supreme Court
D. to demonstrate how much poverty there was in Washington, D.C.

22. Which statement from the article is an opinion?

A. "That simple act of strength by young Thurgood was the first sign of his extraordinary ability to create change for the better."
B. "He pushed for legislation that gave everyone, without regard to race, the right to vote."
C. "He was the first African American to serve as solicitor general and the first to be named to the Supreme Court."
D. "In some states at the time, the law required separation of schoolchildren by race."

23. What is the **main** purpose of including the painting of Marshall in the article?

A. to demonstrate how Supreme Court justices dressed

B. to emphasize that Marshall was an important person in history

C. to show the design of the Supreme Court building in the background

D. to indicate how popular Marshall was with the people he served

24. Based on the information in the article, the author would **most likely** agree that

A. practicing law is not for everyone.

B. segregation should not be allowed.

C. working for civil rights is no longer necessary.

D. laws should not be questioned or changed.

25. Which statement supports the **main** idea of this article?

A. Marshall would not have become a lawyer without changing his name.

B. Marshall worked hard to end segregation in the United States.

C. Marshall was the most famous of all the Supreme Court justices.

D. Marshall was successful even though he did not have an easy childhood.

26. Which book would be **most** helpful for learning about Marshall's feelings about his experiences?

A. *Making Civil Rights Law: Thurgood Marshall and the Supreme Court, 1956–1961*

B. *Simple Justice: The History of* Brown v. Board of Education *and Black America's Struggle for Equality*

C. *Thurgood Marshall: His Speeches, Writings, Arguments, Opinions, and Reminiscences*

D. *Justice for All: Charting the Decisions of the United States Supreme Court in the 1990s*

27. Explain why people think of Thurgood Marshall as a great leader. Use information from the article to support your answer.

Scoring Guide

Score	Description
4	Response provides a thorough explanation of why people think of Thurgood Marshall as a great leader. Explanation includes specific, relevant information from the article.
3	Response provides an explanation of why people think of Thurgood Marshall as a great leader. Explanation includes supporting information from the article, but lacks specificity, relevance, and/or development.
2	Response provides a partial explanation of why people think of Thurgood Marshall as a great leader. Explanation includes limited information from the article and/or is partially correct.
1	Response makes a vague or minimal statement of why people think of Thurgood Marshall as a great leader.
0	Response is totally incorrect or irrelevant.
Blank	No response.

Scoring Notes

Possible reasons people think of Thurgood Marshall as a great leader:

- Changed laws to allow minorities to live in any neighborhood
- Pushed for laws for all people to travel together
- Pushed for laws to give everyone the right to vote
- Worked to stop segregation in the nation's schools

Example of Score Point 4

People think that Thurgood Marshall is a great leader for many reasons. When Thurgood was little his name was Thoroughgood. Later, he changed his name to Thurgood. This small act showed he had the ability to make change for the better. One of his more memorable cases was the Brown decision. The Brown decision insured that no one could be kept out of a school because of their race. This was a strong act that help our society. Another great thing he did was help push that without regard to race, everyone had the right to vote. He also won many cases for the NAACP. Then, he was the first African American to be named to the Supreme Court. These are only some of the reasons people belive That Thurgood Marshall was a great leader. As William Rehnquist said "Equal justic under law - surly no one individual has done more to make those words a reality than Thurgood Marshall

Example of Score Point 3

People think Thurgood Marshall is a great leader because without him, a lot of people wouldn't have been treated equally. Marshall helped make the law that race can not keep children out of public schools. Marshall led the act of stopping segregation by this law, and by standing up for what he believed in. He was a good influence on blacks by being the first African American solicitor general. Marshall was a great, determined leader in the history of America.

Example of Score Point 2

People think Thurgood Marshall was a great leader because he fought for what he believed in. Thurgood won so many cases like the Brown case or the Jewish people. He didn't do it because he felt he needed to. He did it because he felt that we should all be equal. He did it because it was the right thing to do.

Example of Score Point 1

People think of Thurgood Marshel as a great leader because he won many hard cases in coort and made many new laws.

Example of Score Point 0

One of the reason Because his anxiety
record of cheating change made Marshall.

Mathematics Directions for Spring CRT

This Mathematics test contains three test sessions. Mark or write your answers in the Answer Booklet. Use a pencil to mark or write your answers.

This test includes three types of questions: multiple-choice, short-answer, and constructed-response questions.

For the multiple-choice questions, you will be given four answer choices—A, B, C, and D. You are to choose the correct answer from the four choices. Each question has only one answer. After you have chosen the correct answer to a question, find the question number in your Answer Booklet and completely fill in the circle for the answer you chose. Be sure the question number in the Answer Booklet matches the question number in the Test Booklet. The example below shows how to completely fill in the circle.

CORRECT MARK	INCORRECT MARKS
●	❍ ⊙ ◉ ⊘

If you decide to change your answer to a question, erase the wrong mark completely before filling in the circle of the new answer. Be sure you have only one answer marked for each question. **If two circles are bubbled in for the same question, that question will be scored as incorrect.**

If you are having difficulty answering a question, skip the question and come back to it later. Make sure you skip the circle for the question in your Answer Booklet.

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You may make notes or use highlighters in your Test Booklet, but you must bubble or write your final answers in your Answer Booklet. **Do not make any stray or unnecessary marks in your Answer Booklet.**

Let's work through a sample question together to be sure you understand the directions.

Sample Question

1. What is the capital of Montana?
   A. Browning
   B. Glendive
   C. Helena
   D. Missoula

Mathematics (No Calculator)

1. At 6:00 A.M. the temperature, in degrees Fahrenheit, was 6 degrees below zero. By noon the temperature had risen 21 degrees. A cold front came through in the afternoon and caused the temperature to drop 16 degrees by 7:00 P.M. What was the temperature at 7:00 P.M.?

   A. –31°F
   B. –1°F
   C. 11°F
   D. 43°F

2. Study the expression below.

   $$2^6 - 2^3$$

   What is the value of this expression?

   A. 6
   B. 8
   C. 56
   D. 58

3. The product of $2\frac{1}{3}$ and what number is 1?

   A. $\frac{3}{7}$
   B. $\frac{2}{3}$
   C. $\frac{3}{2}$
   D. $\frac{7}{3}$

4. The table below shows a pattern.

x	*y*
0	–2
1	1
2	4
3	7

   What is the rule for this pattern?

   A. $y = 3x - 2$
   B. $y = 2x + 1$
   C. $y = 2x - 2$
   D. $y = x + 2$

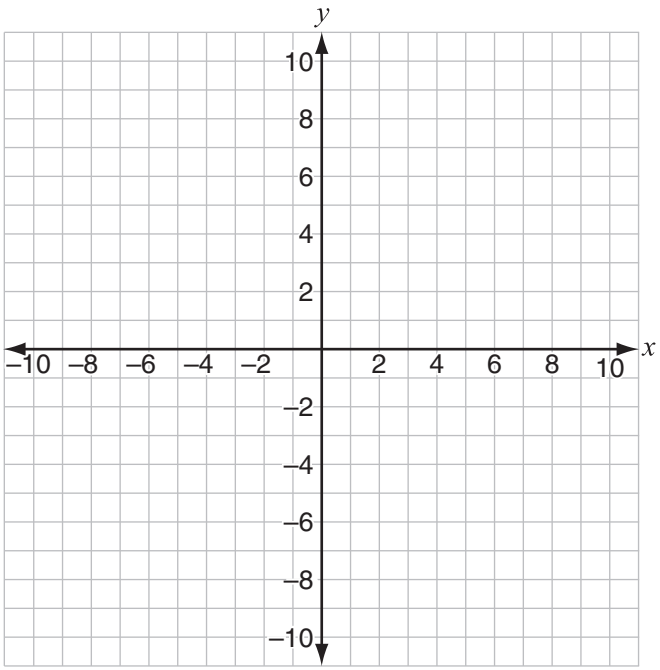
5. Which expression represents the prime factorization of a number?

   A. $2 \times 21 \times 37$
   B. $2 \times 31 \times 43$
   C. $5 \times 11 \times 51$
   D. $7 \times 23 \times 87$

6. Tom has a balance of $17,836 left to pay on his truck. If he continues to make monthly payments of $592, about how long will it take Tom to pay off his truck?

   A. 3 months
   B. 4 months
   C. 30 months
   D. 40 months

7. You may use the coordinate grid below to answer this question.



The graph of a line passes through the points $(0, 3)$ and $(1, 5)$. Which equation could represent the graph of the line?

A. $y = 3x + 2$

B. $y = 2x + 3$

C. $y = 3x + \frac{1}{2}$

D. $y = \frac{1}{2}x + 3$

8. The average mass of a dust particle is 7.5×10^{-7} grams. What is the mass in standard form?

A. 0.00000075 g

B. 0.000000075 g

C. 7.00000005 g

D. 750000000 g

9. Let p and q be two numbers such that:

$$0 < p < q < 1$$

Which statement about p and q must **always** be true?

A. $p + q < 1$

B. $p + q > 1$

C. $pq > 1$

D. $pq < 1$

10. Compute:

40 is 20% of what number?

11. What is the value of the expression below when $p = 100$, $v = 7$, $r = 8$, and $t = 5$?

$pv - rt^2$

12. When Mrs. Stewart makes pie dough, she uses $\frac{2}{3}$ cup of shortening for every $2\frac{1}{2}$ cups of flour. Which proportion could be used to find the amount of flour, x, Mrs. Stewart needs when she uses 5 cups of shortening?

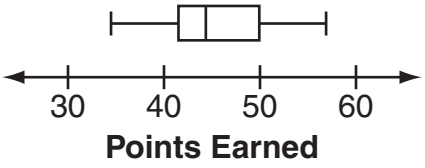
A. $\dfrac{\frac{2}{3}}{2\frac{1}{2}} = \dfrac{x}{5}$

B. $\dfrac{\frac{2}{3}}{x} = \dfrac{2\frac{1}{2}}{5}$

C. $\dfrac{\frac{2}{3}}{5} = \dfrac{x}{2\frac{1}{2}}$

D. $\dfrac{\frac{2}{3}}{2\frac{1}{2}} = \dfrac{5}{x}$

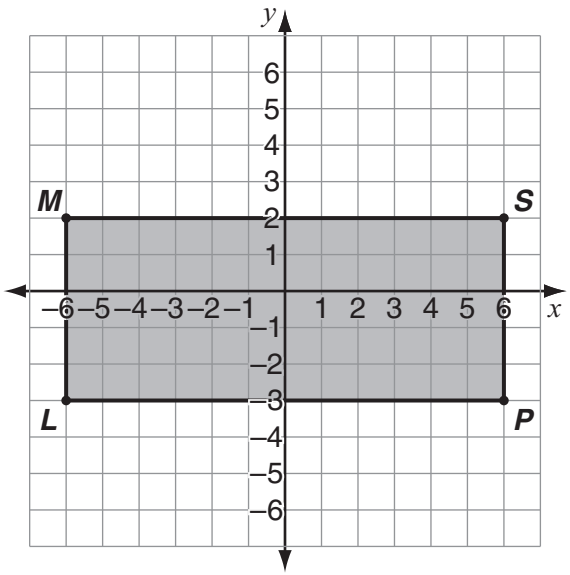
13. Mr. Herman recorded the number of points earned by each student on a recent test. The box-and-whisker plot below represents these data.



Approximately what percent of the students earned 50 points or less?

A. 20%
B. 25%
C. 75%
D. 80%

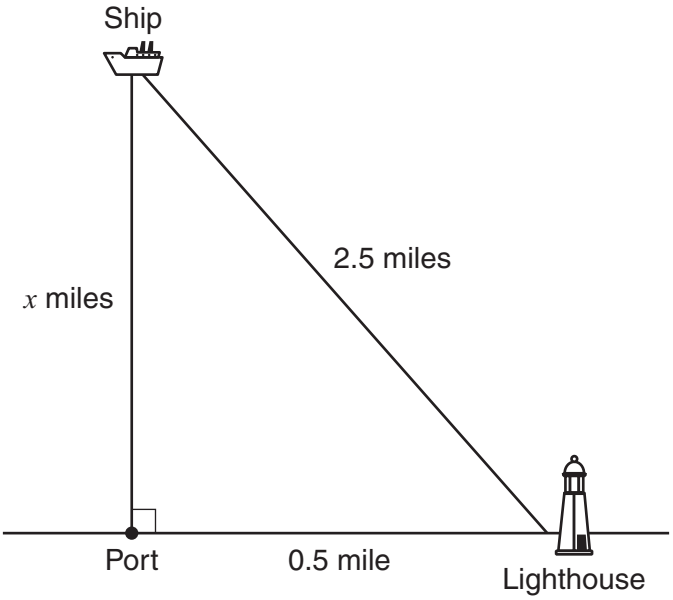
14. Rectangle *MSPL* is plotted on the coordinate grid below.



What is the length of a diagonal of this rectangle?

A. 12 units
B. 13 units
C. 17 units
D. 34 units

15. The diagram below shows the position of a ship relative to a port and a nearby lighthouse.



not drawn to scale

Which equation could be used to calculate x, the distance the ship is from the port?

A. $x + 0.5 = 2.5$

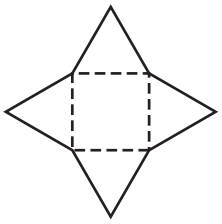
B. $x = 2(0.5) + 2(2.5)$

C. $x^2 + (0.5)^2 = (2.5)^2$

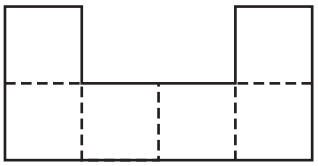
D. $x^2 = (0.5)^2 + (2.5)^2$

16. Which net, when folded along the dotted lines, will form a prism?

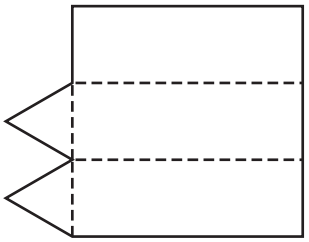
A.



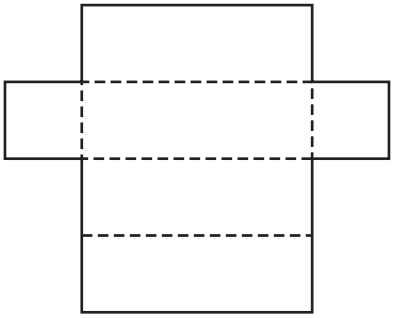
B.



C.



D.



17. Use the expression below to answer the question.

$$9(w + 1)$$

If w is a whole number, which statement is **always** true?

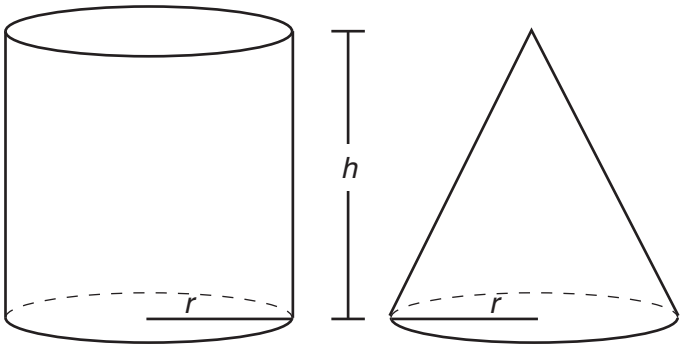
A. The expression is divisible by 2.

B. The expression is divisible by 3.

C. The expression is divisible by 5.

D. The expression is divisible by 6.

18. A cone-shaped tank and a cylindrical tank have the same height and radius as shown in the figure below.



The cylindrical tank holds how many times as much water as the cone-shaped tank?

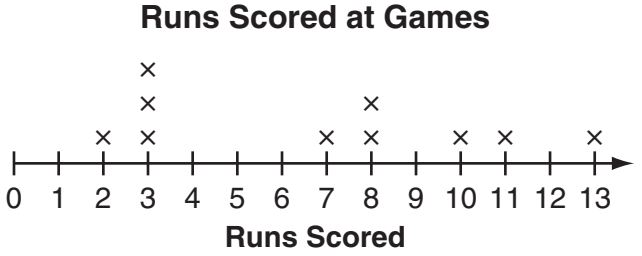
A. $1\frac{1}{3}$ times as much water

B. 2 times as much water

C. $2\frac{2}{3}$ times as much water

D. 3 times as much water

19. The line plot below shows the number of runs a baseball team scored during each of ten games this season.



Which number is closest to the team's **mean** number of runs per game?

A. 3

B. 7

C. 8

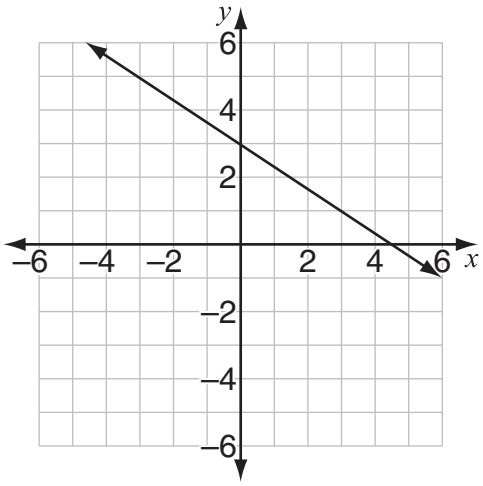
D. 11

20. Simplify:

$$x + 3(x + 4) + 2x$$

A. $4x + 4$
B. $6x + 4$
C. $6x + 12$
D. $10x$

Use the graph below to answer question 21.



21. What is the slope of the line?

A. $-\frac{3}{2}$
B. $-\frac{2}{3}$
C. $\frac{2}{3}$
D. $\frac{3}{2}$

22. Mary is knitting a baby blanket. She must knit 90 rows to complete the project. She can knit 2.5 rows each hour. Which equation represents the number of rows, r, Mary has left to do after h hours of knitting?

A. $r = 90 - 2.5h$
B. $r = 90 - h$
C. $r = 90h - 2.5$
D. $r = 92.5 - h$

23. At a school dance, it is predicted that 80 students will each buy one 12-ounce glass of punch. Based on this prediction, how many gallons of punch should be purchased for the dance?

A. 6.7 gallons
B. 7.5 gallons
C. 20 gallons
D. 30 gallons

24. The county fair has an exhibit of farm animals. The chart below shows the number of animals in the exhibit.

Animals in the Exhibit

Animal	Number in the Exhibit
Sheep	25
Cow	40
Horse	15
Goat	70

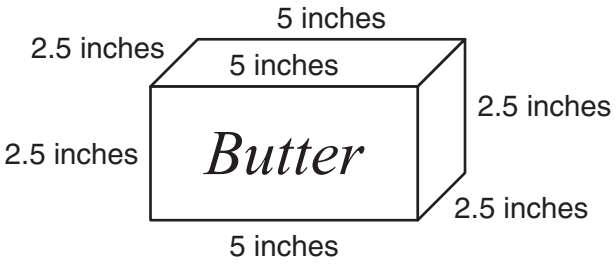
Sandy is making a graph to show the distribution of animals in the exhibit. Which type of graph is the **most** appropriate to use to display these data?

A. circle
B. line
C. stem and leaf
D. histogram

25. Mr. Fox has a gift bag with 5 red pencils, 6 blue pencils, and 3 green pencils. What is the probability that a randomly selected pencil is a color other than red?

A. $\frac{5}{14}$
B. $\frac{5}{9}$
C. $\frac{9}{14}$
D. $\frac{9}{5}$

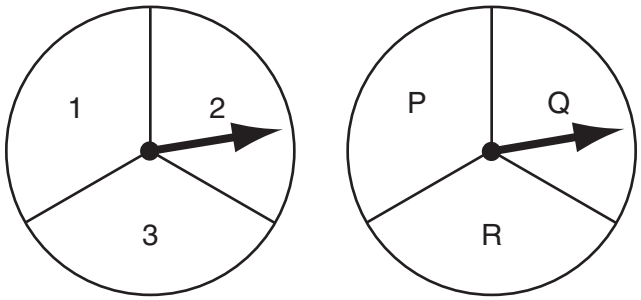
26. A box containing butter has the shape of a rectangular prism, as shown in the diagram below.



What is the volume of the box?

A. 10 cubic inches
B. 20 cubic inches
C. 31.25 cubic inches
D. 62.5 cubic inches

27. Sarah spins the arrows on the two spinners shown below at the same time.



What is the probability that the arrows land on a 2 and an R?

A. $\frac{1}{9}$

B. $\frac{1}{8}$

C. $\frac{1}{3}$

D. $\frac{8}{9}$

28. A spinner has sections that are red, blue, yellow, green, and brown. There are no other colors on the spinner. Michael spun the arrow on the spinner 100 times. The table below shows the number of times the arrow landed on each color.

Color	Number of Times Arrow Landed on Color
Red	24
Blue	17
Yellow	30
Green	23
Brown	6

Michael spins the arrow on the spinner one more time. Based on the data in the table, what is the probability that the arrow will land on red?

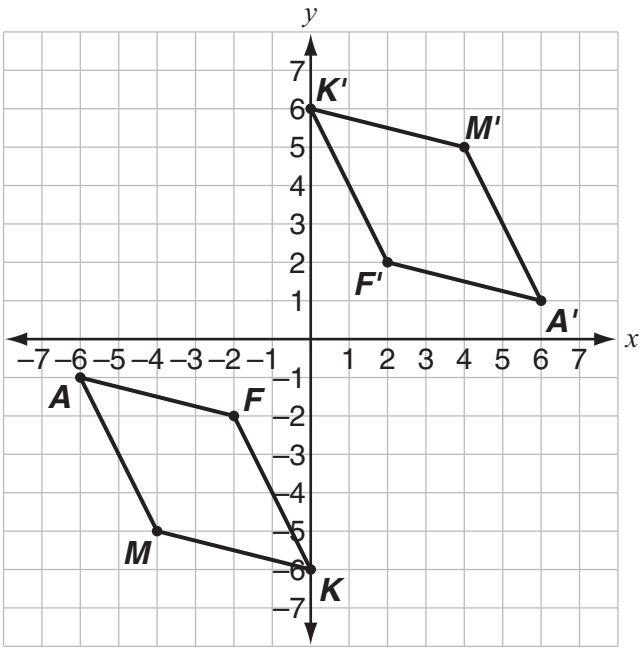
A. $\frac{1}{76}$

B. $\frac{6}{25}$

C. $\frac{6}{19}$

D. $\frac{19}{25}$

29. A parallelogram and its image are shown on the coordinate grid below.



Parallelogram $A'F'K'M'$ is the image of parallelogram $AFKM$ after a transformation.

a. What are the coordinates of point A?

b. Describe a **single** transformation that resulted in the image $A'F'K'M'$.

c. Copy the coordinate grid and parallelogram $AFKM$ into your Answer Booklet. On this coordinate grid, reflect $AFKM$ across the y-axis. Label the image $LQNP$.

Scoring Guide

Score	Description
4	4 points
3	$3 - 3\frac{1}{2}$ points
2	$2 - 2\frac{1}{2}$ points
1	$\frac{1}{2} - 1\frac{1}{2}$ points OR Student shows minimal understanding of graphing and performing transformations on a coordinate graph.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept that is being measured.
Blank	No response.

Scoring Notes

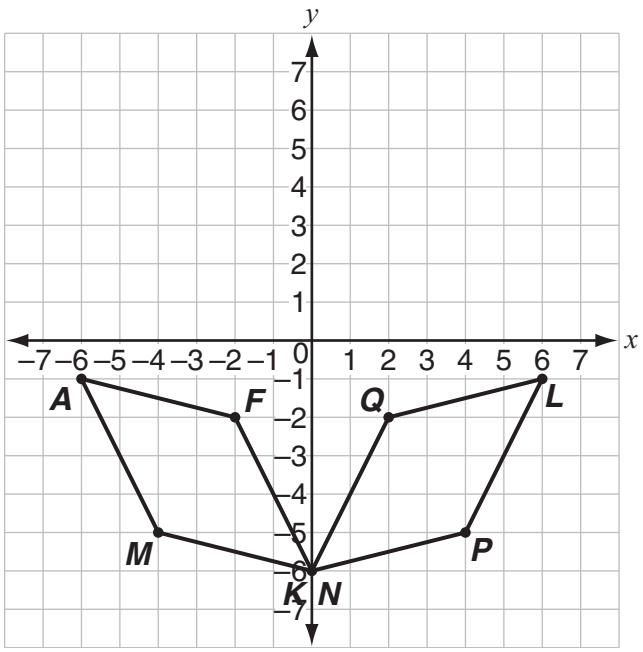
Part a: 1 point for correct coordinates of A, **(–6, –1)**

Part b: 1 point for a correct description of a single transformation that results in the desired image. For example, *AFKM* has been rotated 180 degrees about the origin.

OR

$\frac{1}{2}$ point for the word, rotation

Part c: 2 points for a correct image graphed with or without labels



OR

1 point for an image that has been correctly reflected across the x-axis

or

for showing an understanding of reflecting an image. For example, reflecting correctly over the incorrect axis, or correctly reflecting an incorrectly drawn original image.

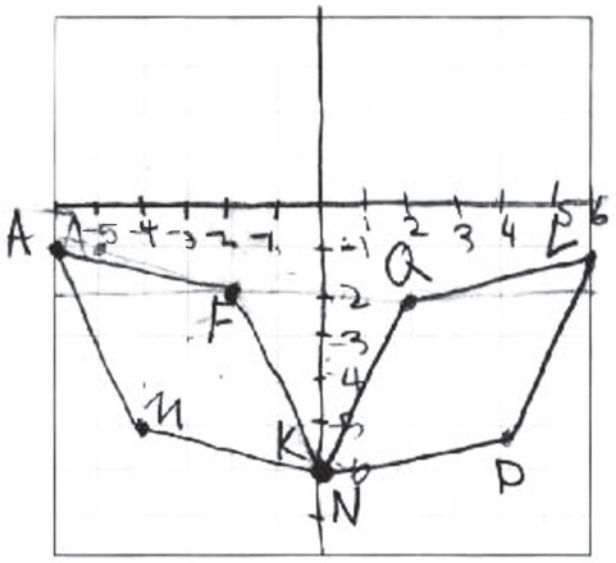
Example of Score Point 4

Sample 1

(a) A (-6, -1)

(b) They rotated counter clockwise 180° from (0,0)

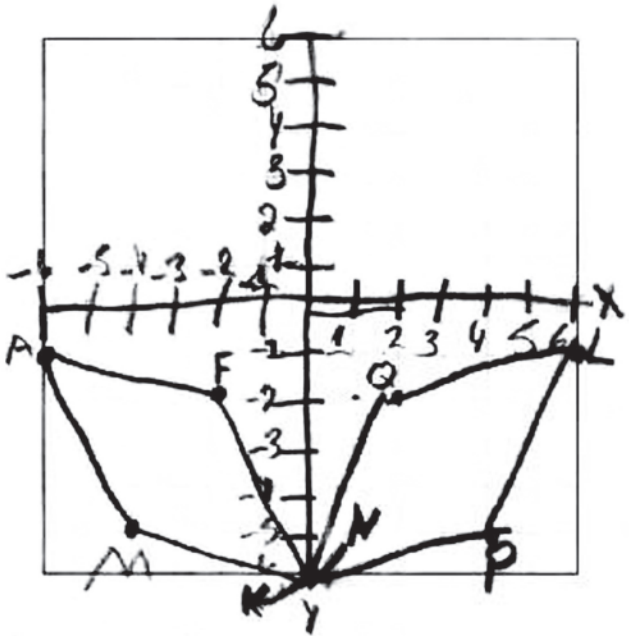
(c) Q = (-2 2)
N' = (-6, 0)
P' = (-5, -4)
L' = (-1, 6]



Example of Score Point 4

Sample 2

A(-6,-1)
B 180° rotation around point (0,0)
C.



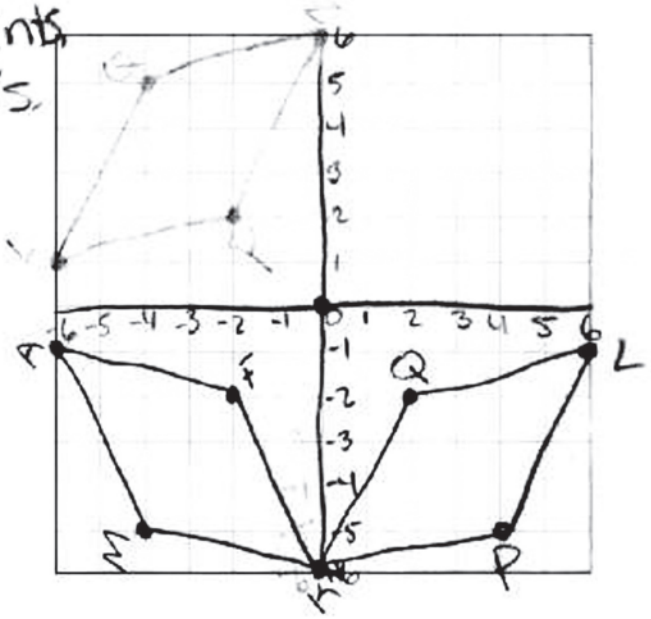
Example of Score Point 3

Sample 1

a) The coordinates for point A are (-6, -1)

b.) A rotation of 180°

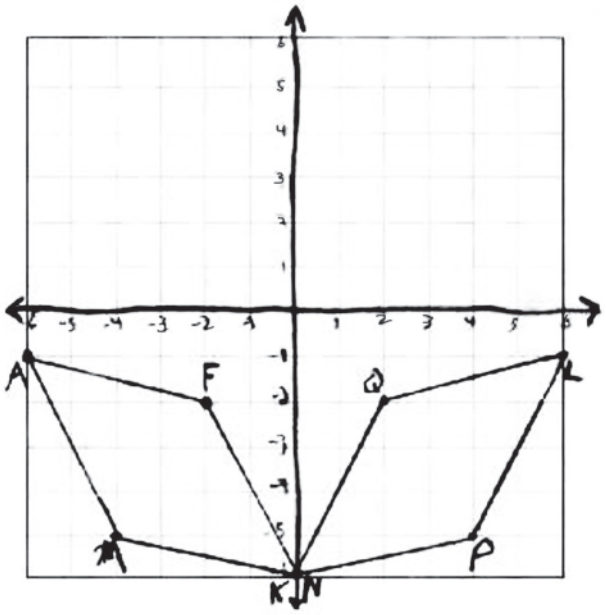
c.) As you can see, I drew my grid down below. LQNP is a reflection of AFKM. All you have to do is have the coordinates in the exact same points only across the y-axis. Then you lable them according to how they look on the original shape.



Example of Score Point 3

Sample 2

A. The coordinates of point A is (-6, -1).
B. The image AFKM was reflected over the origin resulting in the image A'F'K'M'.
C.



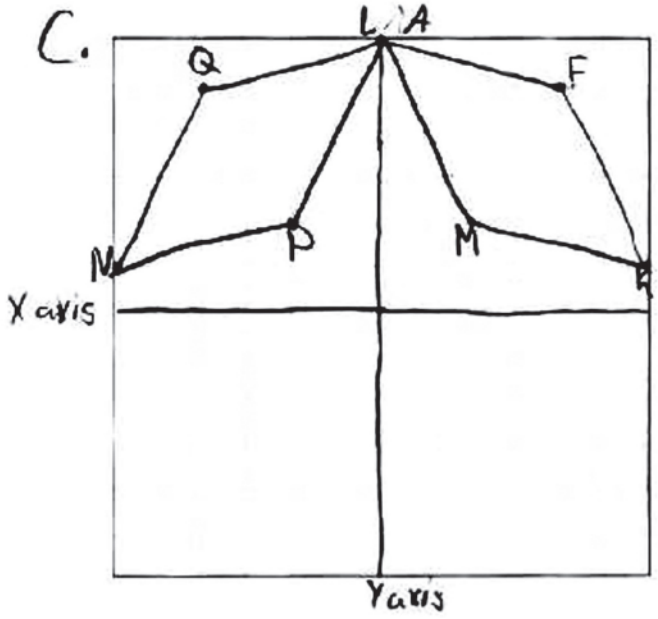
Example of Score Point 2

Sample 1

A. (-6, -1)

B. Slide, the points of K, K', A and A' are the same accept they are opposite of each other.

C.



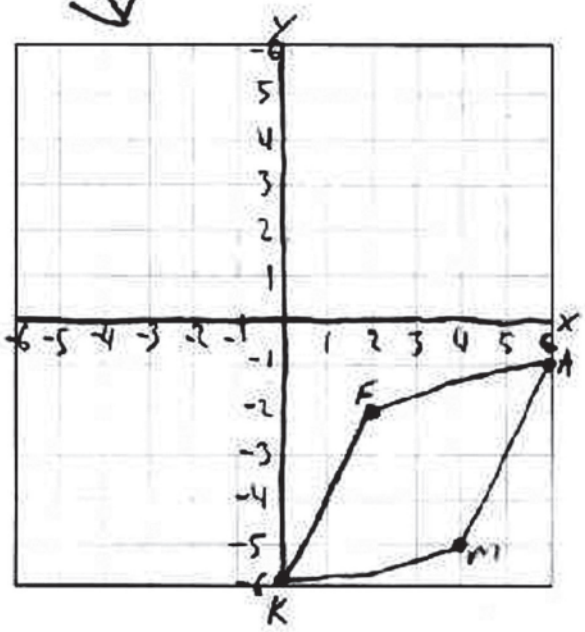
Example of Score Point 2

Sample 2

Ⓐ (G, 1)

Ⓑ A rotation

Ⓒ



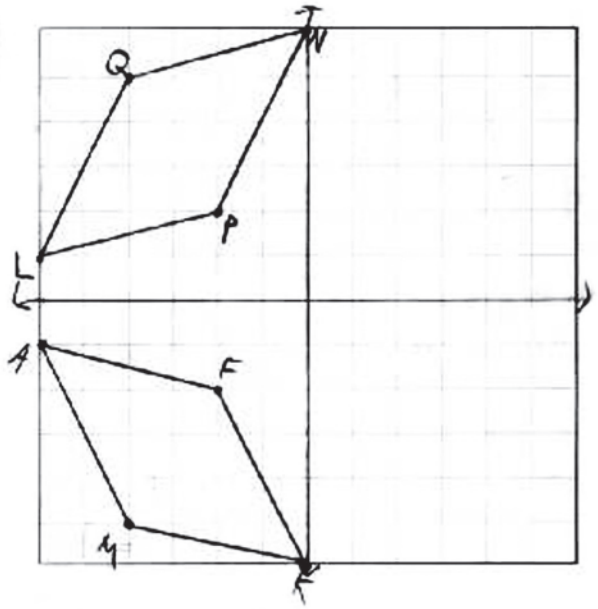
Example of Score Point 1

Sample 1

a.) (6, 1)

b.) The parallelogram AFKM was transformed from the III section to the I section.

c.)

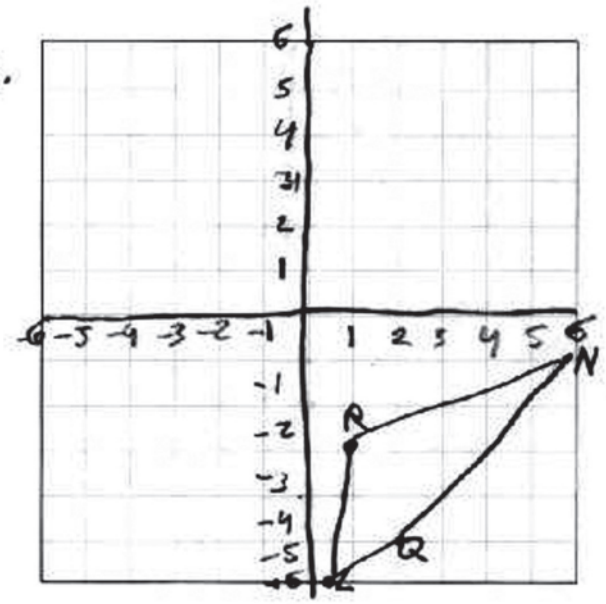


Example of Score Point 1

Sample 2

A (−6, −1)
B a turn of 180
C

C.



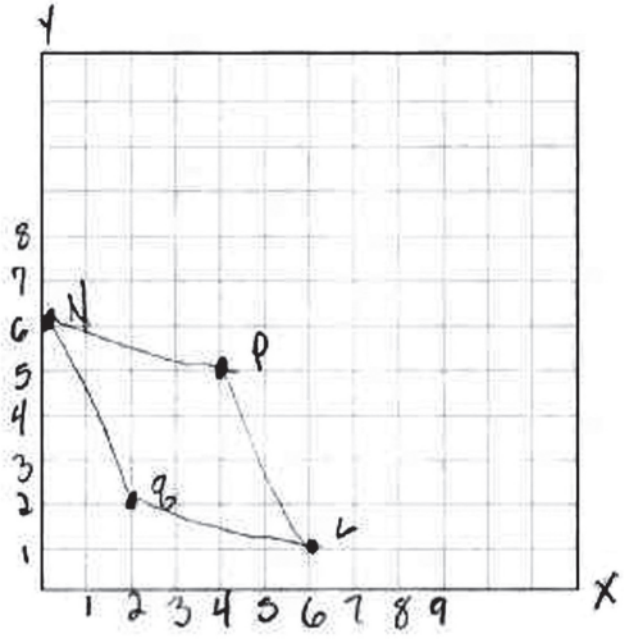
Example of Score Point 0

Sample 1

a (1,6)

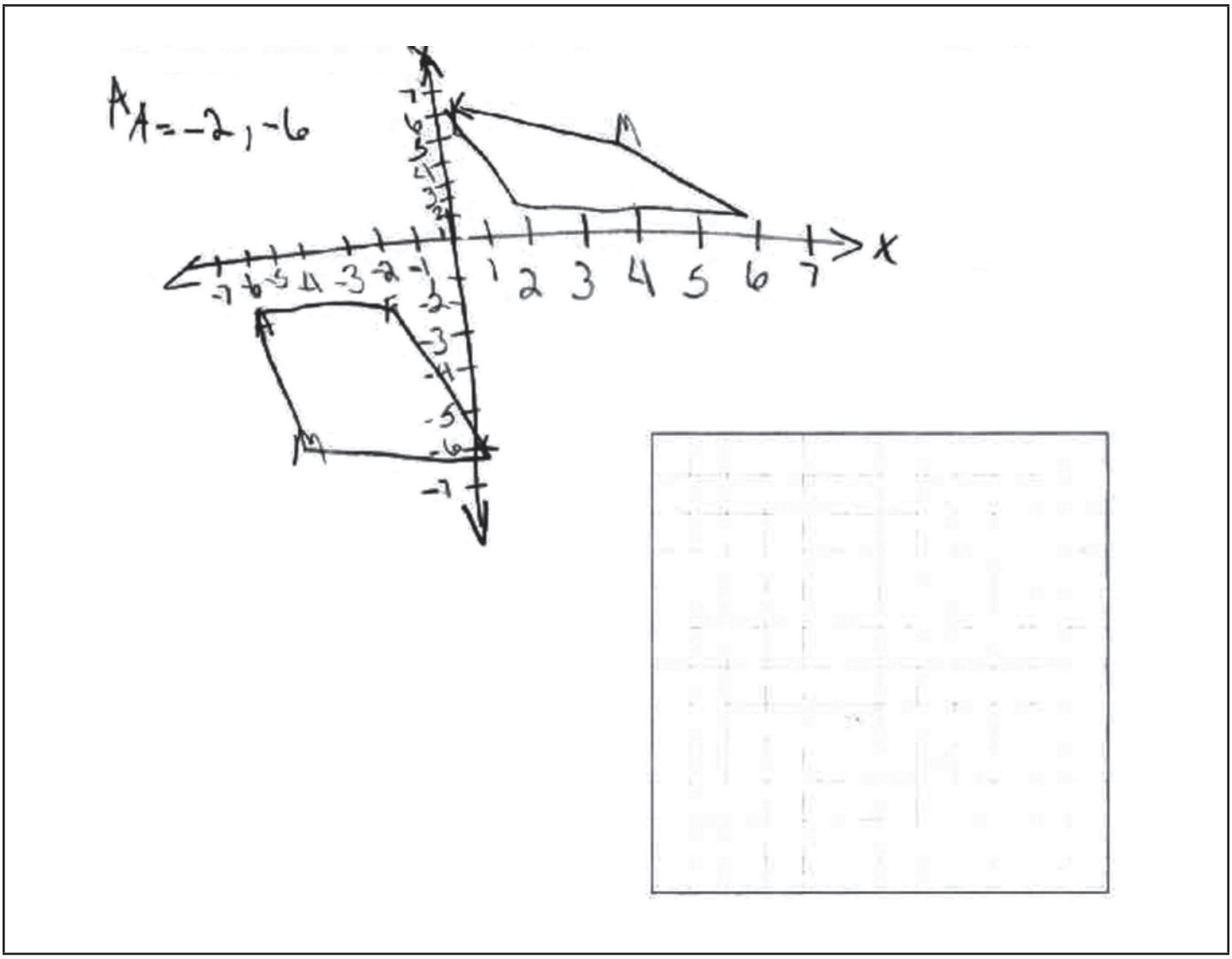
b it moved to the negative

C



Example of Score Point 0

Sample 2



Science Directions for Spring CRT

This Science test contains three test sessions. Mark or write your answers in the Answer Booklet. Use a pencil to mark or write your answers.

This test includes two types of questions: multiple-choice and constructed-response questions.

For the multiple-choice questions, you will be given four answer choices—A, B, C, and D. You are to choose the correct answer from the four choices. Each question has only one answer. After you have chosen the correct answer to a question, find the question number in your Answer Booklet and completely fill in the circle for the answer you chose. Be sure the question number in the Answer Booklet matches the question number in the Test Booklet. The example below shows how to completely fill in the circle.

CORRECT MARK	INCORRECT MARKS
●	❍ ⊙ ◉ ⊘

If you decide to change your answer to a question, erase the wrong mark completely before filling in the circle of the new answer. Be sure you have only one answer marked for each question. **If two circles are bubbled in for the same question, that question will be scored as incorrect.**

If you are having difficulty answering a question, skip the question and come back to it later. Make sure you skip the circle for the question in your Answer Booklet.

For the other types of questions in the Test Booklet, you will be asked to write your answers in the box provided. Read the question carefully. If a question asks you to explain your answer or to show your work, be sure to do so.

You may make notes or use highlighters in your Test Booklet, but you must bubble or write your final answers in your Answer Booklet. **Do not make any stray or unnecessary marks in your Answer Booklet.**

Let's work through a sample question together to be sure you understand the directions.

Sample Question

1. What is the capital of Montana?
   A. Browning
   B. Glendive
   C. Helena
   D. Missoula

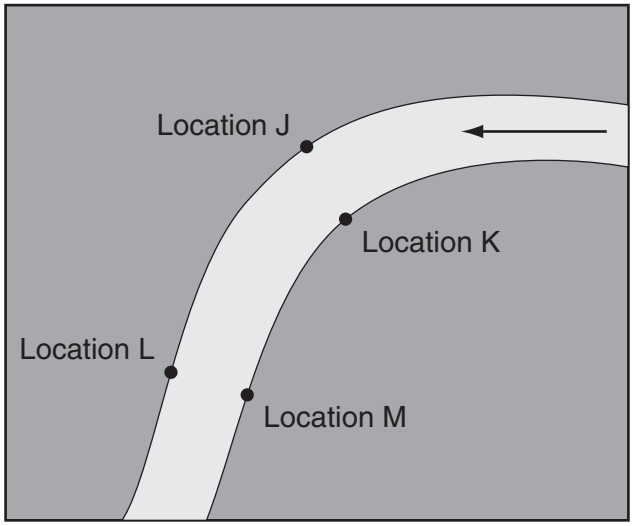
Science

1. Which energy transformation occurs when gasoline burns in an automobile engine?

   A. chemical energy to mechanical energy
   B. electrical energy to light energy
   C. wave energy to heat energy
   D. magnetic energy to sound energy

2. The map below shows the path of a river. The arrow shows the direction the river flows.

Map Showing the Path of a River



As water runs along the path of the river, at which location will the **most** erosion occur?

   A. Location J
   B. Location K
   C. Location L
   D. Location M

3. Part of a dichotomous key used to identify trees by their leaves is shown below.

Key to Trees in the Northeast

Step	Description of Leaves	Go to Step
1. a	Leaves are evergreen, thin, needle-like	2
b	Leaves are broad, deciduous	6
2. a	Needles are over 1 inch long, in clusters	3
b	Needles are $\frac{1}{2}$ inch long or less	4
3. a	Needles are in clusters of 3	Pitch pine
b	Needles are in clusters of 5	Eastern white pine
4. a	Needles are scale-like, sharp, cover twigs	Eastern red cedar
b	Needles protrude from twigs	5
5. a	Needles are flat, rounded tips, in 2 rows along twig	Eastern hemlock
b	Needles are in whorl around the stem	White spruce

A student wants to identify the leaf shown below.

Unknown Leaf (actual size)

According to the key, which tree has this type of leaf?

   A. pitch pine
   B. eastern white pine
   C. eastern red cedar
   D. white spruce

4. An individual with the genetic disorder phenylketonuria (PKU) has to limit protein intake. PKU is a recessive disorder (**aa**). The Punnett square below shows the cross between two carriers of the disorder (**Aa**).

	A	**a**
A	**AA**	**Aa**
a	**Aa**	**aa**

What percentage of the children are predicted to have the disorder?

A. 0%
B. 25%
C. 75%
D. 100%

5. Which is the simplest level of organization that carries out the basic life process of providing energy to an organism?

A. cell
B. organ
C. organ system
D. tissue

6. Which elements make up most of the Sun's mass?

A. aluminum and iron
B. carbon and oxygen
C. hydrogen and helium
D. uranium and plutonium

7. A student researched the relationship between body mass and heart rate for different animal species. The student recorded the data shown in the table below.

Masses and Heart Rates of Different Animal Species

Animal	Mass (kg)	Heart Rate (beats/min.)
Squirrel	0.6	390
Seal	25	25
Sheep	50	75
Pig	100	60
Dolphin	170	70
Horse	420	45
Elephant	2500	38

Which conclusion is **best** supported by the data?

A. Ocean-dwelling species have about the same heart rate.
B. Large species have lower heart rates than small species.
C. Land-dwelling species have lower heart rates as species size increases.
D. Species with a mass greater than 30 kg have heart rates less than 70 beats/min.

8. Which conditions are **most likely** to produce dew on grass during the night?

A. cold, dry air that gets warmer
B. cold, humid air that gets warmer
C. warm, dry air that gets colder
D. warm, humid air that gets colder

9. In an investigation, a student puts half a slice of bread into each of two jars and then moistens each slice with 10 drops of water. He places one jar in sunlight and the other jar in a dark closet. Both jars are stored at the same temperature. He observes the jars every two days for two weeks to determine the amount of mold growth on the bread. The table below shows the percentage of each slice of bread that had mold growth.

Day	Mold Growth in Sunlight (percent)	Mold Growth in the Dark (percent)
2	0	0
4	0	8
6	2	12
8	8	20
10	10	35
12	12	50
14	15	90

a. Write a logical, testable hypothesis for this investigation.

b. Name **one** controlled variable in this investigation.

c. Write a conclusion based on the results of the investigation.

d. Support your conclusion with data from the investigation.

Scoring Guide

Score	Description
4	Response demonstrates a thorough understanding of determining relevant variables and a control, formulating a testable hypothesis, predicting the outcome of an investigation, and comparing and analyzing data. The response gives a logical, testable hypothesis, names one controlled variable, and gives a conclusion based on results. Response has no errors or omissions.
3	Response demonstrates a general understanding of identifying a question, determining relevant variables and a control, formulating a testable hypothesis, planning and predicting the outcome of an investigation, safely conducting scientific investigations, and comparing and analyzing data. The response gives a logical, testable hypothesis, names one controlled variable, and gives a conclusion based on results. Response has one error or omission.
2	Response demonstrates a limited understanding of identifying a question, determining relevant variables and a control, formulating a testable hypothesis, planning and predicting the outcome of an investigation, safely conducting scientific investigations, and comparing and analyzing data. The response gives a logical, testable hypothesis, names one controlled variable, and gives a conclusion based on results. Response has two errors or omissions.
1	Response demonstrates a minimal understanding of identifying a question, determining relevant variables and a control, formulating a testable hypothesis, planning and predicting the outcome of an investigation, safely conducting scientific investigations, and comparing and analyzing data. The response gives a logical, testable hypothesis, names one controlled variable, and gives a conclusion based on results. Response has one correct part and several errors or omissions.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Scoring Notes

a. Sample Hypothesis
   More mold grows on a piece of bread in the dark than in sunlight.
   Notes:
   Given that the item specifically asks for a hypothesis, a research question is not acceptable.
   The hypothesis does not need to be a true statement.
b. Possible Controlled Variables
   amount of water
   temperature
   time (number of days)
   bread
   jar
c. Sample Conclusion
   Mold grows better in a dark environment.
d. Possible Support for Conclusion
   At the end of day 14, the mold in the dark covered 6 times as much of the bread as the mold in the light.

Award one point for each part.

Example of Score Point 4

a. My hypothesis is when placed in the dark a slice of bread with 10 drops of water on it will grow more mold than when placed in sunlight.

b. One controlled variable is the amount of water that was put on the slice of bread. (10 drops)

c. As you can see mold groth in the sun had a less percentage of mold on it than compared to mold growth in the dark, which had the greatest amount of mold on it.

d. The mold growth in the sunlight, after 14 days, was only 15 percent and mold growth in the dark was at 90 percent after 14 days.

Example of Score Point 3

A: I think that mold forms faster in a dark room.
B = No mold was formed on day 2 of the experiment.
C = The mold on the bread formed faster when it was in the dark closet. D = On day 14 mold growth in sunlight was only 15%. On day 14 mold growth in the dark closet was 90%.

Example of Score Point 2

A. Which bread will mold the fasteat?
B. The mold growth in Sunlight stayed the same for four days.
C. The Mold Growth in Sunlight produces less mold than the mold Growth in the Dark
D. after fourteen days it was only 15% for the mold in Sunlight, and 90% for the mold in the Dark

Example of Score Point 1

A. I think that mold grows faster in the sade all the time.

B.

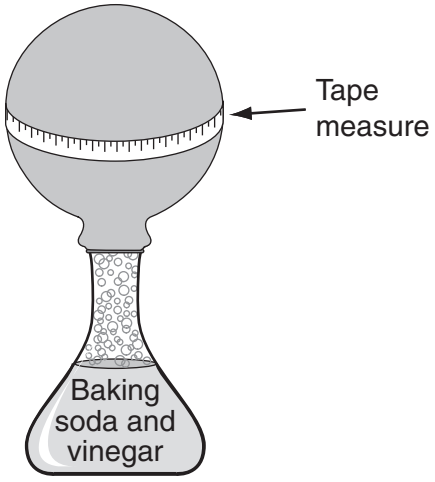
C.

D.

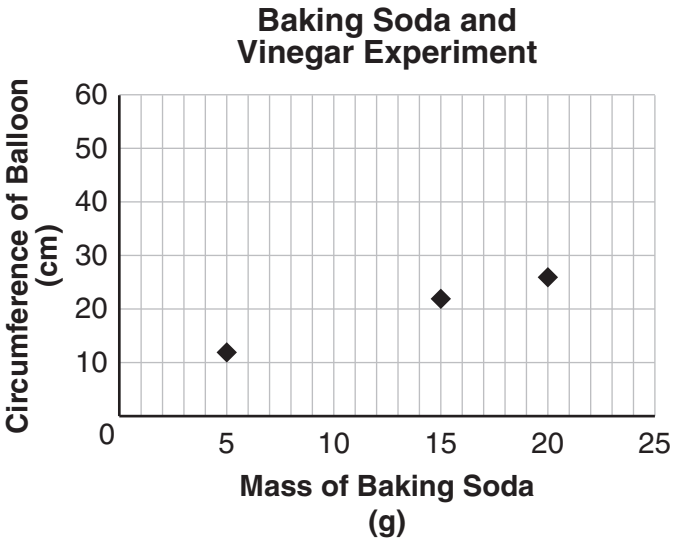
Example of Score Point 0

c) There more mold growth in Sun light than in night time

10. A student adds baking soda to vinegar in a flask and then covers the opening of the flask with a balloon, as shown below.



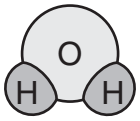
A gas is created and the balloon expands. The student measures the balloon's circumference with a tape measure. The student performs the experiment three times. Each time, the student mixes a different amount of baking soda with 45 mL of vinegar. A graph of the data is shown below.



What is the **best** estimate of the circumference of the balloon when 10 g of baking soda are mixed with 45 mL of vinegar?

A. 5 cm
B. 17 cm
C. 22 cm
D. 42 cm

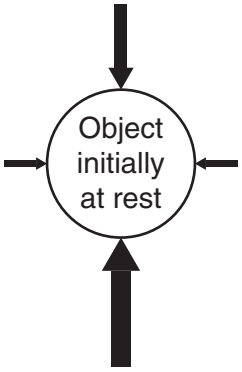
11. The diagram below shows the composition of water.



Which statement uses scientific terms correctly to describe the composition of water?

A. Water is an element made of two hydrogen atoms and one oxygen molecule.
B. Water is a mixture composed of two hydrogen molecules and one oxygen atom.
C. Water is a mixture composed of two hydrogen atoms and one oxygen atom.
D. Water is a compound made of two hydrogen atoms and one oxygen atom.

12. The diagram below shows four forces acting on an object initially at rest. The size of each arrow is a representation of the amount of force acting on the object.



Which statement describes the resulting motion of the object?

A. The object speeds up while moving upward.
B. The object moves at a constant speed to the right.
C. The object slows down while moving downward.
D. The object travels at varying speeds to the left.

13. Which statement describes the inner planets of the solar system?

A. They are the largest objects in the solar system.
B. They are composed mostly of gas.
C. They have a thin atmosphere or no atmosphere.
D. They are beyond the asteroid belt.

14. Residents living by a lake complain about the mosquitoes. Town officials propose spraying the area with a chemical that will kill the mosquito larvae. The residents worry that the chemical will poison the animals in and around the lake. Which solution will decrease the mosquito population with the **least** harm to the environment?

A. draining swamp areas to reduce mosquito breeding grounds
B. building bat houses to increase the population of bats that eat mosquitoes
C. bringing in a new species of fish that eat mosquitoes
D. spraying the chemical only in the spring when mosquitoes first mate

15. Scientists study fossilized dinosaur dung by cutting samples into thin slices and examining them under high-powered microscopes. What information can scientists discover about a dinosaur using this technique?

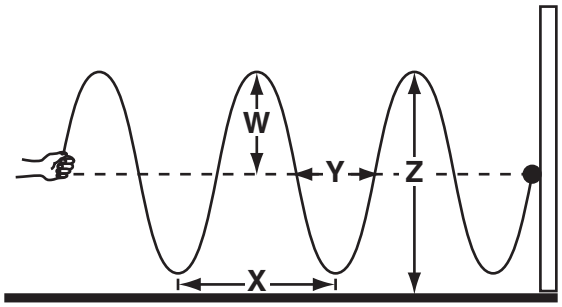
A. the age of the dinosaur
B. the gender of the dinosaur
C. the type of food the dinosaur ate
D. the time period when the dinosaur lived

16. Which type of rock forms at mid-ocean ridges?

A. basalt
B. granite
C. marble
D. sandstone

17. The diagram below shows a student moving a rope up and down to make a wave.

Wave Moving through a Rope

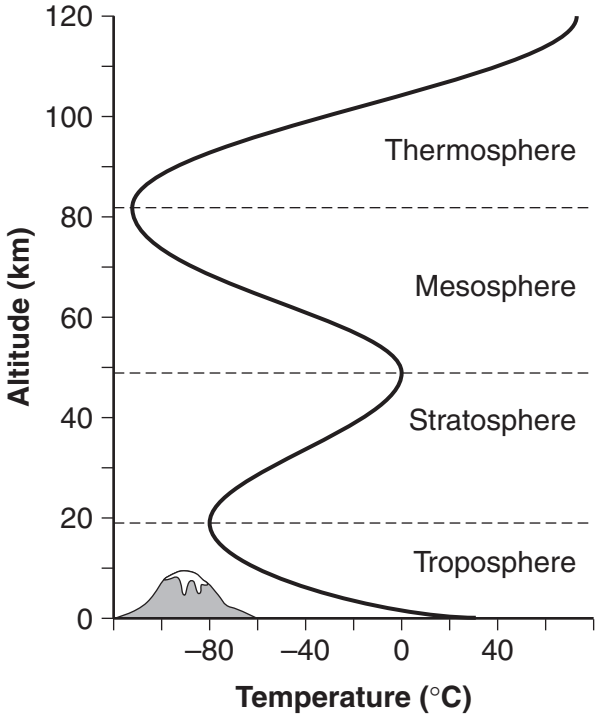


Which part of the diagram shows the wavelength?

A. part W
B. part X
C. part Y
D. part Z

18. The graph below shows the relationship between two characteristics of the atmosphere.

Relationship between Temperature and Altitude of the Atmosphere



What is the relationship between the atmosphere's temperature and its altitude?

A. The temperature decreases as the altitude decreases.
B. The temperature alternately decreases and increases as the altitude increases.
C. The temperature generally increases as the altitude increases.
D. The temperature stays the same as the altitude changes.

19. Which motion causes night and day on Earth?

A. the Sun's motion around its axis
B. Earth's motion around its axis
C. Earth's motion around the Sun
D. the Moon's motion around Earth

20. The table below shows the melting and boiling points of four different elements.

Element	Melting Point (°C)	Boiling Point (°C)
1	1772	3827
2	–218	–182
3	112	444
4	–38	356

Which element is a liquid at room temperature?

A. Element 1
B. Element 2
C. Element 3
D. Element 4

21. A student is measuring the time it takes for 100 mL of water to flow through five inches of a particular soil sample. The student repeats the same experiment three times. What is the **best** reason for repeating the experiment?

A. to examine the effect of soil type
B. to minimize measurement error
C. to investigate the effect of particle size
D. to choose the best result from the three trials

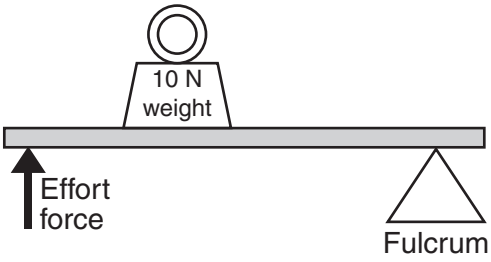
22. What happens when a liquid is heated?

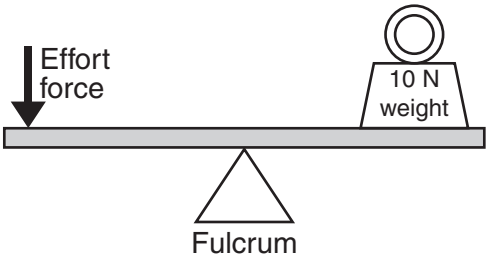
A. Its particles get larger, taking up more space.
B. Its particles get smaller and move faster, taking up more space.
C. Its particles get larger and move faster, taking up more space.
D. Its particles remain the same size but move faster, taking up more space.

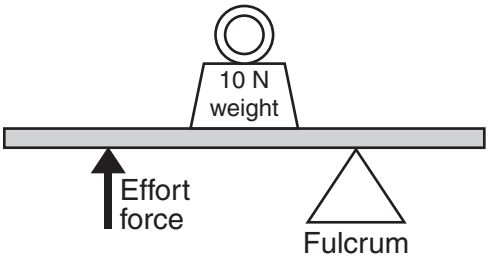
23. A student finds a trilobite fossil in a rock layer. If the rock layers are undisturbed, which statement is true about the rock layer **above** the trilobite fossil?

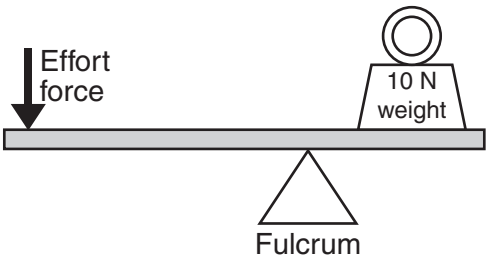
A. The rock layer is older than the trilobite fossil.
B. The rock layer is younger than the trilobite fossil.
C. The rock layer contains fossils older than the trilobite fossil.
D. The rock layer contains fossils of organisms with a simpler structure than a trilobite.

24. Which system will require the **least** effort force to lift the weight?

A.


B.


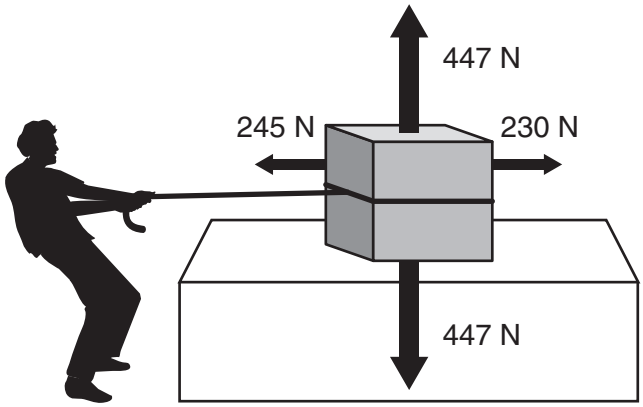
C.


D.


25. Which processes occur as limestone changes into marble?

A. slow cooling and crystallization
B. high temperatures and pressure
C. erosion, deposition, and compaction
D. melting and cooling on Earth's surface

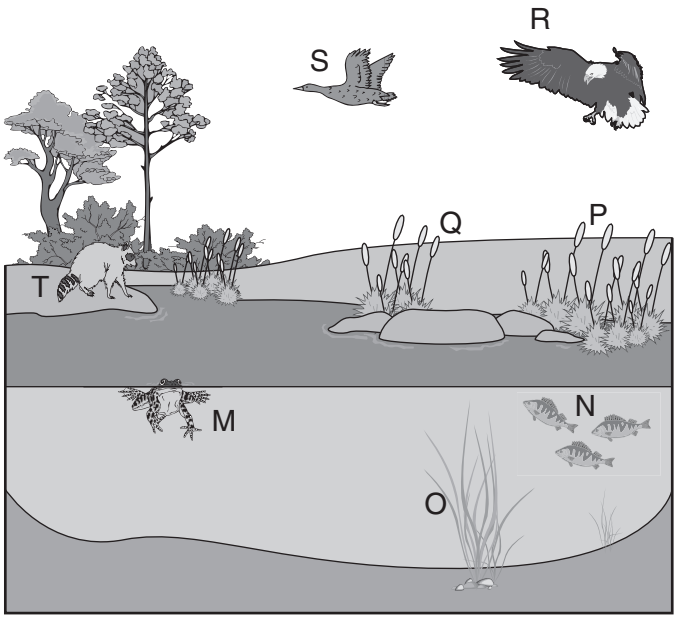
26. The diagram below shows a person pulling on a crate. The arrows show the forces acting on the crate. The numbers indicate the sizes of the forces.



What is the net force (sum of the forces) acting on the crate?

A. 15 N to the left
B. 447 N up
C. 475 N to the right
D. 894 N down

27. The diagram below shows a pond ecosystem.



Pond Ecosystem

Which organisms belong to the same population?

A. organisms M and T
B. organisms N and O
C. organisms P and Q
D. organisms R and S

28. Which list shows the order of events that today's scientists believe led to the formation of the solar system?

A. solar nebula → Sun → planetesimals → planets
B. Sun → planetesimals → planets → solar nebula
C. planetesimals → planets → solar nebula → Sun
D. planets → solar nebula → Sun → planetesimals

Acknowledgments

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